

Claims

[c1] 1. A combination valve (15) for pressure control and venting in a fuel system for delivering fuel to an internal combustion engine, comprising a primary valve cone (25), which is supported so that it is displaceable between two limit positions in a cylinder bore (24) in a valve housing (23), against the action of a first spring element (26), the displacement of the valve cone from an inoperative limit position into an operative limit position leading to the opening of a connection between an inlet duct (32) and an outlet duct (33) in the valve housing, wherein the valve cone (25) is provided with an inner passage (27), which is designed to accommodate a secondary valve cone (28), which is displaceable between a support surface (29) and a valve seat (30) against the action of a second spring element (31) having a lower spring constant than the first spring element, displacement of the secondary valve cone against the action of the second spring element (31) leading to the opening of a connection between the inlet duct (32) and a venting duct (34).

[c2] 2. The combination valve as claimed in claim 1, wherein

the secondary valve cone (28) interacts with the valve seat (30) in such a way that a comparatively small partial flow can pass the said valve cone when this rests against the seat.

- [c3] 3. The combination valve as claimed in claim 2, wherein the seat (30) is provided with an axial groove which determines the size of the said partial flow.
- [c4] 4. The combination valve as claimed in claim 1, wherein the valve housing (23) is provided with a lateral duct (35) to the cylinder bore (24), the lateral duct being designed to be connected to a return line (16) arranged in the fuel system, and being closed by the primary cone (25) when this is displaced against the action of the first spring element (26).
- [c5] 5. The combination valve as claimed in claim 4, wherein the lateral duct (35) is closed by the primary cone (25) during displacement of the primary cone from an inoperative position to an operative position, before the connection between the inlet duct (32) and the outlet duct (33) is opened.
- [c6] 6. A fuel system for the use of a combination valve according to claim 1 in a fuel system for a vehicle, wherein the valve (15) is located in a vertically elevated position

in the fuel system.

- [c7] 7. The fuel system as claimed in claim 6, wherein a primary fuel pump (12) for normal pressurization of the fuel system and a secondary fuel pump (22) for venting of the fuel system.
- [c8] 8. The fuel system as claimed in claim 7, wherein a water separator (19) having a sensor (19a) for detecting the presence of water in the fuel and an electrically operable drain valve (20).
- [c9] 9. The fuel system as claimed in claim 7, wherein the secondary fuel pump (22) is connected to a microprocessor, which permits activation of the said pump for a preprogrammed length of time which is sufficient to expel any air occurring in the fuel system through the combination valve (15), or to remove water from the water separator (19).